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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/904,704	07/12/2001	Joseph M. Rinaldis	4121-4	4760

22442 7590 09/21/2005

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EXAMINER	
JEAN GILLES, JUDE	

ART UNIT	PAPER NUMBER
2143	

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/904,704	RINALDIS ET AL.	
	Examiner	Art Unit	
	Jude J. Jean-Gilles	2143	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2001*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Action is in regards to the Reply received on 06/22/2005.

Response to Amendment

1. This action is responsive to the application filed on 06/22/2005. Claims 1-7, 10, 16, 20, and 21 were amended. No new claim is added. Claims 1-21are pending. Claims 1-21 represent a method and apparatus for an "improved RAID 1 write performance in low cost systems."

Response to Arguments

2. Applicant's arguments with respect to claims 1, 10 and 16 have been carefully considered, but are not deemed fully persuasive. Applicant's arguments are deemed moot in view of the following new ground of rejection as explained here below, necessitated by Applicant substantial amendment (i.e., a method for an improved RAID 1 write performance in low cost systems) to the claims which significantly affected the scope thereof.

The dependent claims stand rejected as articulated in the First Office Action and all objections not addressed in Applicant's response are herein reiterated.

Information Disclosure Statement

3. The references listed on the Information Disclosure Statement submitted on 07/12/2001 have been considered by the examiner (see attached PTO-1449A).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-2, and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barkley et al (Barkley) U.S. Patent No. 6;389,493 B1, in view of Wu et al (Wu) U.S. Patent No. 6,813,688 B2.

Regarding claim 1: Barkley teaches a method for controlling data transfer between a host and a plurality of storage devices (*fig. 1, item 110; column 3, lines 5-29*), comprising:

receiving first data for storage at a transport master, wherein said data for storage is addressed to said transport master (*fig. 1, item 112 ; column 1, lines 55-61; it is important to note that the master card coupled to the bus is our transport master*);

receiving said first data for storage at a transport slave, wherein said data for storage is addressed to said transport master, (*fig. 1, item 116; column 1, lines 55-67; column 2, lines 1-3; it is important to note that the slave cards are the transport slave*);

providing from said transport master said data for storage to a first storage device interface (*fig. 1, items 124, 126, and 130; column 4, lines 30-37*);

providing from said transport slave said data for storage to a second storage device interface (*fig. 1, items 218, 220, and 222; column 8, lines 57-65*);

storing said first data for storage on a first device (*fig. 1, items 124, 126, and 130; column 4, lines 30-37*); and

storing said first data for storage on a second device (*fig. 1, items 218, 220, and 222; column 8, lines 57-65*).

However, Barley does not specifically disclose a method "wherein said first data for storage is received at said transport master and said transport slave substantially simultaneously" and "wherein said first data for storage is provided to said first device interface and to said second device interface substantially simultaneously".

In the same field of endeavor, Wu teaches a mirroring logic configurable to provide address signals from ATA controller 14 to both the master device and the slave device. Mirroring logic 32 is used to configure both devices 16a and 16B to be selected simultaneously (i.e., simultaneously writes to devices 16A and 16B) [see Wu, fig. 2-3; column 6, lines 57-66].

Accordingly, it would have been obvious to one of ordinary skill in the networking art at the time the invention was made to have incorporated Wu's teaching of providing storage to said first device interface and to said second device interface substantially simultaneously with the teachings of Barkley, for the purpose of improving the ability of a network "*to have a mechanism for more efficiently mirroring data in storage systems such as ATA systems in which conventionally only one drive on a port may be written to at a time*" as stated by Wu in lines 3-7 of column 3. By this rationale, claim 1 is rejected.

Regarding claim 2: The combination Barkley-Wu teaches the method of claim 1, further comprising:

receiving a request for one of said first data and second data at said transport master, wherein said request for data is addressed to said transport master (*column 2, lines 10-16*);

receiving said request for one of said first data and second data at said transport slave, wherein said request for data is addressed to said transport master (*column 9, lines 12-16*);

providing from said transport master said request for one of said first data and second data to said first device interface (*column 6, lines 34-39, and 49-56*);

providing from said transport slave said request for one of said first data and second data to said second device interface (*column 9, lines 12-16*); and

retrieving said requested one of said first data and second data from said first device and from said second device, wherein in a normal operating mode said requested one of said first data and second data from said first device is provided by said transport master to said host and said requested one of said first data and second data from said second device is not provided to said host (*column 2, lines 4-16*).

Regarding claim 6: The combination Barkley-Wu teaches the method of claim 1, wherein in a non-RAID operating mode said first data for storage and addressed to said transport master received at said transport slave is not stored on said second storage device (*column 4, lines 46 -57*).

Regarding claim 7: The combination Barkley-Wu teaches the method of claim 1, wherein said step of providing said first data comprises constructing a data packet and providing said data packet to said first device interface and to said second device interface (*column 3, lines 48-52; fig. 1, items 119, 211; note that data packets are inherent to a data link layer*).

Regarding claim 8: The combination Barkley-Wu teaches the method of claim 1, wherein said transport master and said transport slave are interconnected to a host system bus by a system bus interface (*column 1, lines 55-64; fig. 1, items 112, 114, 116, and 134*).

6. Claims 1-2, and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rust et al (Rust) U.S. Patent No. 6,801,954 B1, in view of Wu et al (Wu) U.S. Patent No. 6,813,688 B2.

Regarding claim 16: Rust et al teach a RAID controller (*fig. 3, items 82a-b*), comprising:

a system bus interface(*column 4, lines 10-12; fig. 2, items 58*);

a transport master interconnected to said system bus interface (*column 13, lines 17-23; fig. 3, items 54a-b*);

a first device interface interconnected to said transport master (*column 7, lines 46-56*);

a first storage device directly interconnected to said first device interface;

a transport slave interconnected to said system bus interface (*column 13, lines 17-23; fig. 3, items 54a-b*); and

a second device interface interconnected to said transport master slave,

a second storage device directly interconnected to said second device interface, (*column 7, lines 46-56*).

However, Rust does not specifically disclose a method wherein at least one of a command and data addressed to said transport master and received at said system bus interface is passed to said transport master and is passed to said transport slave substantially simultaneously.

In the same field of endeavor, Wu teaches a mirroring logic configurable to provide address signals from ATA controller 14 to both the master device and the slave device. Mirroring logic 32 is used to configure both devices 16a and 16B to be selected simultaneously (i.e., simultaneously writes to devices 16A and 16B) [see Wu, fig. 2-3; column 6, lines 57-66].

Accordingly, it would have been obvious to one of ordinary skill in the networking art at the time the invention was made to have incorporated Wu's teaching of providing storage to said first device interface and to said second device interface substantially simultaneously with the teachings of Rust, for the purpose of improving the ability of a network "*to have a mechanism for more efficiently mirroring data in storage systems such as ATA systems in which conventionally only one drive on a port may be written to at a time*" as stated by Wu in lines 3-7 of column 3. By this rationale, claim 16 is rejected.

Regarding claim 17: The combination Rust-Wu teaches the RAID controller of claim 16, wherein in a first mode of operation at least one of a command and data received at said transport master is provided to said first device interface and said at least one of a command and data received at said transport slave is provided to said second device interface (*column 10, lines 55-65*).

Regarding claim 18: The combination Rust-Wu teaches the RAID controller of claim 17, wherein in a second mode of operation data received at said transport master is provided to said first device interface, and wherein said data received at said transport slave is not provided to said second device interface (*column 11, lines 60-67*).

Regarding claim 19: The combination Rust-Wu teaches the RAID controller of claim 16, further comprising:

a multiplexer (*fig. 6, item 604*), comprising a first input interconnected to said first device interface, a second input interconnected to said second device interface, and an output interconnected to said transport master (*column 9, lines 29-44*).

Regarding claim 20: The combination Rust-Wu teaches the RAID controller of claim 19, wherein in a normal operating mode data read from said first storage device is provided to said multiplexer (*fig. 6, item 604*), wherein said data read from said first storage device is provided to said transport master, wherein data read from said second storage device is provided to said transport slave and to said multiplexer, and wherein said data read from said second storage device is not passed by said multiplexer to said transport master (*column 8, lines 66-67; column 10, lines 20-25*).

Regarding claim 21: The combination Rust-Wu teaches the RAID controller of claim 19, wherein in a failover mode data read from said first storage device is provided to said multiplexer (*fig. 6, item 604*), wherein said data read from said first storage device is not passed by said multiplexer to said transport master, wherein data read from said second storage device is provided to said transport slave and to said multiplexer, and wherein said data read from said second storage device is passed by said multiplexer to said transport master (*column 8, lines 66-67; column 10, lines 20-25*).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 3-5, and 9-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barkley et al (U.S. Patent No. 6,389,493 B1) in view of Rust et al (U.S. 6,801,954 B1).

Regarding claim 3: Barkley et al disclose the invention substantially as claimed. Barkley et al teach the method of claim 2, wherein said requested one of said first and second data from said first device is not provided to said host and said requested one of said first and second data from said second device is provided to said host (*column 2, lines 10-16*).

However Barkley et al is silent on the above teaching in a failover mode context. In the same field of endeavor, Rust et al disclose "*two mirrored memories that further maintain two duplicative copies of a write cache, each write cache temporarily stores data before it is written out to the disk array. A possible point of failure can occur and corrupt both memories in the transports and this invention provides a failover solution to that problem*" [*see Rust, column 4, lines 55-56*].

Accordingly, it would have been obvious to one of ordinary skill in the networking art at the time the invention was made to have incorporated Rust et al's teachings of possible single points failure with the teachings of Barkley et al, for the purpose of improving the ability of a network "*to facilitate intelligent memory management and allow the system to optimize performance and security* " as stated by Rust in lines 38-40 of column 2.

Regarding claim 4: The combination Barkley-Rust teaches the method of claim 1, further comprising:

passing a write confirmation signal from said first storage device interface to said transport master; and passing a write confirmation signal from said second storage device interface to said transport slave [*see Rust, column 7, lines 20-28*]. By this rationale **claim 4** is rejected.

Regarding claim 5: The combination Barkley-Rust teaches et al teach the method of claim 1, further comprising:

passing a write confirmation signal from said first storage device interface to said transport master [*see Rust, column 7, lines 20-40*];

passing a write failure signal from said second storage device interface to said transport slave[*see Rust, column 4, lines 55-65*];

providing said write failure signal to said transport master; and notifying said host of said write failure signal.[*see Rust, column 7, lines 45-56*]. By this rationale **claim 5** is rejected.

Regarding claim 9: The combination Barkley-Rust teaches the method of claim 1, wherein said method implements a RAID level 1 storage scheme [*see Rust, column 1, lines 46-49; column 5, lines 31-36*]. By this rationale **claim 9** is rejected.

Regarding claim 10: Barkley et al disclose the invention substantially as claimed. Barkley et al teach a method for storing and retrieving data in a system, comprising:

receiving data for storage from a first communications bus at a system bus interface, wherein said data for storage is addressed to a transport master (*fig. 1, item 112 ; column 1, lines 55-61; it is important to note that the master card coupled to the bus is our transport master*);

providing said data for storage to said transport master (*fig. 1, items 124, 126, and 130; column 4, lines 30-37*);

providing said data for storage to a transport slave at substantially the same time said data for storage is provided to said transport master (*fig. 1, item 116; column 1, lines 55-67; column 2, lines 1-3; it is important to note that the slave cards are the transport slave*); and

storing said data in a first storage device and a second storage device substantially simultaneously (fig. 1, items 124, 218; *column 4, lines 30-33; column 8, lines 57-61*).

However Barkley et al is silent on the step of storing and retrieving data in a RAID 1 system, enabling a RAID 1 operation.

In the same field of endeavor, Rust et al disclose "*Rust et al disclose an innovative RAID memory transaction manager that supports concurrent transaction processing modules, while providing for mirrored transactions that move data to multiple destinations efficiently and with atomicity*" [*see Rust, column 1, lines 45-49; column 6, lines 39-56*].

Accordingly, it would have been obvious to one of ordinary skill in the networking art at the time the invention was made to have incorporated Rust et al's teachings of the RAID 1 system with the teachings of Barkley et al, for the purpose of improving the ability of a network "*to avoid inefficient use of memory and loss of messages in a queue associated with slave or master cards*" as stated by Rust in lines 39-46 of column 1.

Regarding claim 11: The combination Barkley-Rust teaches the method of claim 10, wherein said step of enabling RAID 1 operation comprises enabling said transport slave to act on at least one of commands and data addressed to said transport master [*see Rust, column 13, lines 17-24*]. By this rationale **claim 11** is rejected.

Regarding claim 12: The combination Barkley-Rust teaches the method of claim 11, wherein a RAID 1 enable signal is provided to enable RAID 1 operation [*see Rust, column 5, lines 10-22*]. By this rationale **claim 12** is rejected.

Regarding claim 13: The combination Barkley-Rust teaches the method of claim 12, wherein said RAID 1 enable signal is generated by at least one of a host processor and a local processor [*see Rust, column 5, lines 23-30*]. By this rationale **claim 13** is rejected.

Regarding claim 14: The combination Barkley-Rust teaches the method of claim 10, further comprising retrieving data from said first and second storage devices, wherein said data retrieved from said first storage device is passed to said transport master, and wherein said data retrieved from said second device is passed to said transport slave [*see Rust, column 8, lines 25-36*]. By this rationale **claim 14** is rejected.

Regarding claim 15: The combination Barkley-Rust teaches the method of claim 14, wherein a request for data addressed to said transport master is provided to said transport master at substantially the same time that said request for data is provided to said transport slave [*see Rust, column 7, lines 46-56*]. By this rationale **claim 11** is rejected.

Response to Arguments

9. Applicant's Request for Reconsideration filed on 06/22/2005 has been carefully considered but is not deemed fully persuasive. However, because there exists the likelihood of future presentation of this argument, the Examiner thinks that it is prudent to address Applicants' main points of contention.

A. The Barkley patent and the Rust patent fail to disclose or suggest, and is not all related to, a particular limitations regarding a RAID controller incorporating a multiplexer.

B. Applicant contends that Claims 1, 10 and 16 recites that the transport master provides the first data to a first storage device for storage at substantially the same time that the transport slave provides the first data for storage to a second device ant that the references in record do not.

C. Applicant contends that there is no motivation to combine the reference teachings of Barkley and Rust, and that there must be a reasonable expectation of success.

10. As to "Point A" it is the position of the Examiner that Barkley in detail teaches the limitations of the above mentioned claims. However, in view of Applicant's remarks, stating that Barkley teaches a particular limitations regarding a RAID controller incorporating a multiplexer [*see Barkley, column 3, lines 5-62*].

As to "Point B", it is also the Examiner's position that Wu teaches in fig. 2-3; column 6, lines 57-66, the transport master that provides the first data to a first storage device for storage at substantially the same time that the transport slave provides the first data for storage to a second device.

As to "Point C", it is also the Examiner's position that Barkley and Rust in combination teach the claimed invention with a reasonable expectation for success [see rejection of claim 3 above].

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

13. Any inquiry concerning this communication or earlier communications from examiner should be directed to Jude Jean-Gilles whose telephone number is (571) 272-3914. The examiner can normally be reached on Monday-Thursday and every other Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wiley, can be reached on (571) 272-3923. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-9000.

Jude Jean-Gilles

Patent Examiner

Art Unit 2143

JJG

September 18, 2005

DAVID WILEY
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